



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,711	04/17/2001	Stephen G. Withers	UBC. P-005 - 2	1131

21121 7590 11/21/2001
OPPEDAHL AND LARSON LLP
P O BOX 5068
DILLON, CO 80435-5068

EXAMINER

SLOBODYANSKY, ELIZABETH

ART UNIT	PAPER NUMBER
----------	--------------

1652

DATE MAILED: 11/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action SummaryApplication No.
09/837,711

Applicant(s)

Withers et al.Examiner
Elizabeth SlobodyanskyGroup Art Unit
1652☒ Responsive to communication(s) filed onAugust 30, 2001☐ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims☒ Claim(s) 40-70 is/are pending in the application.Of the above, claim(s) 51-54, 56-70 is/are withdrawn from consideration.☐ Claim(s) _____ is/are allowed.☒ Claim(s) 40-50, 55 is/are rejected.☐ Claim(s) _____ is/are objected to.☒ Claims 40-70 are subject to restriction or election requirement.**Application Papers**☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.☐ The drawing(s) filed on _____ is/are objected to by the Examiner.☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.☐ The specification is objected to by the Examiner.☐ The oath or declaration is objected to by the Examiner.**Priority under 35 U.S.C. § 119**☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been☐ received.☐ received in Application No. (Series Code/Serial Number) _____☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).**Attachment(s)**☒ Notice of References Cited, PTO-892☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____☐ Interview Summary, PTO-413☐ Notice of Draftsperson's Patent Drawing Review, PTO-948☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 1652

DETAILED ACTION

This application is a continuation of application 09/091,272, now US Patent 6,284,494.

The amendment filed August 30, 2001 canceling claims 1-39 and adding claims 40-70 has been entered.

Claims 40-70 are pending.

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 40-55, drawn to a method for synthesizing an oligosaccharide using mutant glycosidase enzymes, classified in Class 435, subclass 74.
- II. Claim 56-60, drawn to a mutant glycosidase, classified in Class 435, subclass 201.
- III. Claims 61-70, drawn to an enzymatically prepared oligosaccharide, classified in Class 536, subclass 4.1.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and III are patentably distinct because an oligosaccharide and an enzyme are different compounds each with its own chemical structure and function, and

Art Unit: 1652

they have different utilities. An enzyme of invention II can be used for the production of an oligosaccharide of invention III and for the production of an antibody and for hydrolysis of the glycosidic bonds, for example. An oligosaccharide of invention III can be prepared by an enzymatic method of invention I and by chemical synthesis.

Inventions II and I are related as product and method of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). Invention II is not limited in use to synthesis of an oligosaccharide but can be used for their hydrolysis and for the production of an antibody, for example.

Inventions of Group I and III are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the oligosaccharide can be made chemically.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their divergent subject matter, fall into different statutory classes of invention, and are separately classified and searched, restriction for examination purposes as indicated is proper.

Art Unit: 1652

This application contains claims directed to the following patentably distinct species of the claimed invention: enzymes recited in claims 55, 57 and 59.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 40, 41, 50, 55 and 56 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable

Art Unit: 1652

over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Dr. Marina Larson on November 5, 2001 a provisional election was made traverse to prosecute the invention of Group I, with election of species of β -galactosidases, claims 40-50 and 55. Affirmation of this election must be made by applicant in replying to this Office action. Claims 51-54 and 56-70 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(l).

Information Disclosure Statement

The instant application contains no IDS.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to

Art Unit: 1652

enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 40-50 and 55 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 40-50 and 55 are drawn to a method of use of a glycosidase mutated at one of two catalytic carboxy amino acids for synthesizing an oligosaccharide wherein glycosyl donor and glycoside acceptor have opposite stereochemical configurations. Thus, the claims are drawn to a method of use of an enormous genus of a mutated glycosidase both naturally occurring and man made in a reaction that is reverse from the normal direction.

Applicants invented the use of the mutant glucosidase as a glucosynthase. Glycosidases encompass several classes of enzymes, they are known to be substrate, stereo- and regio-specific. Applicants disclose one mutant inverting glycosidase, the *Agrobacterium* β -glucosidase E358A mutant (AbgE358A), which is able to catalyze said reaction. Therefore, a representative number of mutated glycosidases catalyzing the requisite reaction is one. No other glycosidases, including any β -galactosidases, catalyzing said reaction are disclosed in the specification or known in the art. There is no indication in the art that any glycosidase or β -galactosidase having the requisite

Art Unit: 1652

mutation will be able to catalyze the coupling of any glycosyl donor and any glycosyl acceptor when they have either the same or opposite stereochemical configuration.

Therefore, based on the instant disclosure, it is unpredictable whether any glycosidase/ β -galactosidase when mutated at one of the two catalytically active carboxylic amino acids will catalyze coupling of a glycosyl donor and a glycoside acceptor having opposite stereochemical configurations. Thus, a method of coupling of a glycosyl donor and a glycoside acceptor having opposite stereochemical configurations using a mutant glycosidase/ β -galactosidase lacks sufficient written description.

Claims 40-50 and 55 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of AbgE358A for synthesizing an oligosaccharide, does not reasonably provide enablement for the same use of any other glycosidase, including β -galactosidase. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Factors to be in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir. 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the

Art Unit: 1652

art, (7) considered in determining whether undue experimentation is required, are summarized the predictability or unpredictability of the art, and (8) the breadth of the claims.

Factors pertinent to this discussion include predictability of the art, guidance in the specification, breadth of claims, and the amount of experimentation that would be necessary to use the invention.

Claims 40-50 and 55 are so broad as to encompass method of use of any glycosidase, including β -galactosidase, in which one of the two catalytic carboxy amino acids is mutated, in a stereospecific reaction. The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of glycosidase, including β -galactosidase, enzymes broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes in a protein's amino acid sequence would result in the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence are responsible for the requisite mechanism of action, substrate, stereo- and regio-specificity, and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the method of use of a single glycosidase mutant, AbgE358A, which is able to catalyze the requisite reaction. No other glycosidases, including any β -galactosidases, catalyzing said reaction are

Art Unit: 1652

disclosed in the specification or known in the art. The closest prior art teaches the coupling of two identical molecules having the same stereochemical configuration using the AbgE358A mutant (Wang et al.). Therefore, based on the instant disclosure and the state of the art, it is unpredictable whether any glycosidase/ β -galactosidase when mutated at one of the two catalytically active carboxylic amino acids will catalyze coupling of a glycosyl donor and a glycoside acceptor having opposite stereochemical configurations by either inverting or retaining mechanism.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make a mutant glycosidase/ β -galactosidase that could be used in a claimed method in a manner reasonably correlated with the scope of the claims.

Without sufficient guidance, making a mutant glycosidase/ β -galactosidase having the desired catalytic function is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 1652

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 40-50 and 55 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 5,716,812. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are claiming common subject matter, as follows: a method of coupling a glycosyl donor and a glycoside acceptor having opposite stereochemical configurations using a mutant glycosidase.

Claims 40-50 and 55 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6,284,494. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are claiming common subject matter, as follows: a method of coupling a glycosyl donor and a glycoside acceptor having opposite stereochemical configurations using the *Agrobacterium* β -glucosidase E358A mutant as defined in claims 1 and 2 of U.S. Patent No. 6,284,494.

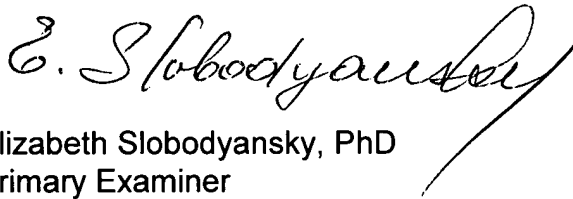
No claims are allowed.

Art Unit: 1652

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Slobodyansky whose telephone number is (703) 306-3222. The examiner can normally be reached Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy, can be reached at (703) 308-3804. The FAX phone number for Technology Center 1600 is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Center receptionist whose telephone number is (703) 308-0196.

A handwritten signature in cursive script, reading "E. Slobodyansky". The signature is written in black ink and is positioned above the printed name and title.

Elizabeth Slobodyansky, PhD
Primary Examiner

November 15, 2001